

# Bound Reports

## 1720

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## Aberdeen Phase III at Kings Ridge

### Stormwater Summary

Aberdeen Phase III is located in Section 4, Township 23S, and Range 26E of the Kings Ridge North subdivision. This phase is part of the previously approved drainage basins (13, 14, 15, & 16). Basin 13 consists of 3.77 acres, which includes 3.77 acres of Aberdeen Phase III. Basin 14 consists of 5.40 acres, which includes 5.40 acres of Aberdeen Phase III. Basin 15 consists of 10.83 acres, which includes 1.24 acres of Aberdeen Phase III. Basin 16 consists of 38.30 acres, which includes 2.66 acres of Aberdeen Phase III. These basins were last permitted by SJRWMD under Kings Ridge North Clubhouse (Permit # 4-069-19411-13) and Kings Ridge North (Permit # 4-069-0326M~~7~~-ERP). This Project will consist of 59 lots, roadways and connections to the existing stormwater system.

#### Basin 13:

	Acres	%	CN	Product
Aberdeen Phase III	3.77	100	58.6	58.6
Total	3.77	100		58.6

#### Aberdeen Phase III Curve Number Calculation

Homes/Driveways                      17\*3200/43560                      = 1.25 Ac.

Impervious area                      = 1.25 Ac.

Pervious area                          = 2.52 Ac.

$$CN = ((0.98*1.25)+(0.39*2.52))/3.77 = 58.6$$

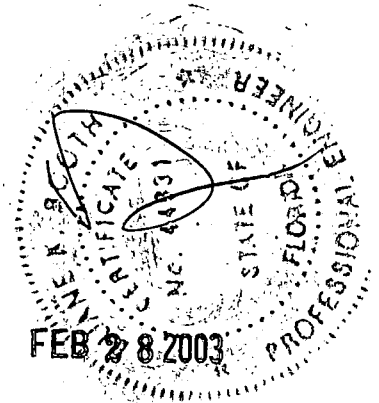
Since the curve number of 58.6 is less than the previously approved 60 we are still in compliance.

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PDS  
ALTAMONTE SVC. CTR.

19411-16



**Basin 14:**

	Acres	%	CN	Product
<b>Aberdeen Phase III</b>	<b>5.40</b>	<b>100</b>	<b>59.5</b>	<b>59.5</b>
Total	5.40	100		59.5

**Aberdeen Phase III Curve Number Calculation**

Homes/Driveways	17*3200/43560	= 1.25 Ac.
Roads	25*1100/43560	= 0.63 Ac.

Impervious area = 1.88 Ac.

Pervious area = 3.52 Ac.

$$CN = ((0.98*1.88)+(0.39*3.52))/5.40 = 59.5$$

Since the curve number of 59.5 is less than the previously approved 63 we are still in compliance.

**Basin 15:**

	Acres	%	CN	Product
Devonshire at Kings Ridge	9.59	89	50.6	45.03
<b>Aberdeen Phase III</b>	<b>1.24</b>	<b>11</b>	<b>67.1</b>	<b>7.38</b>
Total	10.83	100		52.41

**Aberdeen Phase III Curve Number Calculation**

Homes/Driveways	8*3200/43560	= 0.59 Ac.
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Impervious area = 0.59 Ac.

Pervious area = 0.65 Ac.

$$CN = ((0.98*0.59)+(0.39*0.65))/10.83 = 67.1$$

Since the curve number of 52.41 is less than the previously approved 53 we are still in compliance.

**Basin 16:**

	Acres	%	CN	Product
Aberdeen Phase II	35.64	93	54.8	51.0
<b>Aberdeen Phase III</b>	<b>2.66</b>	<b>7</b>	<b>67.2</b>	<b>4.70</b>
Total	38.30	100		55.7

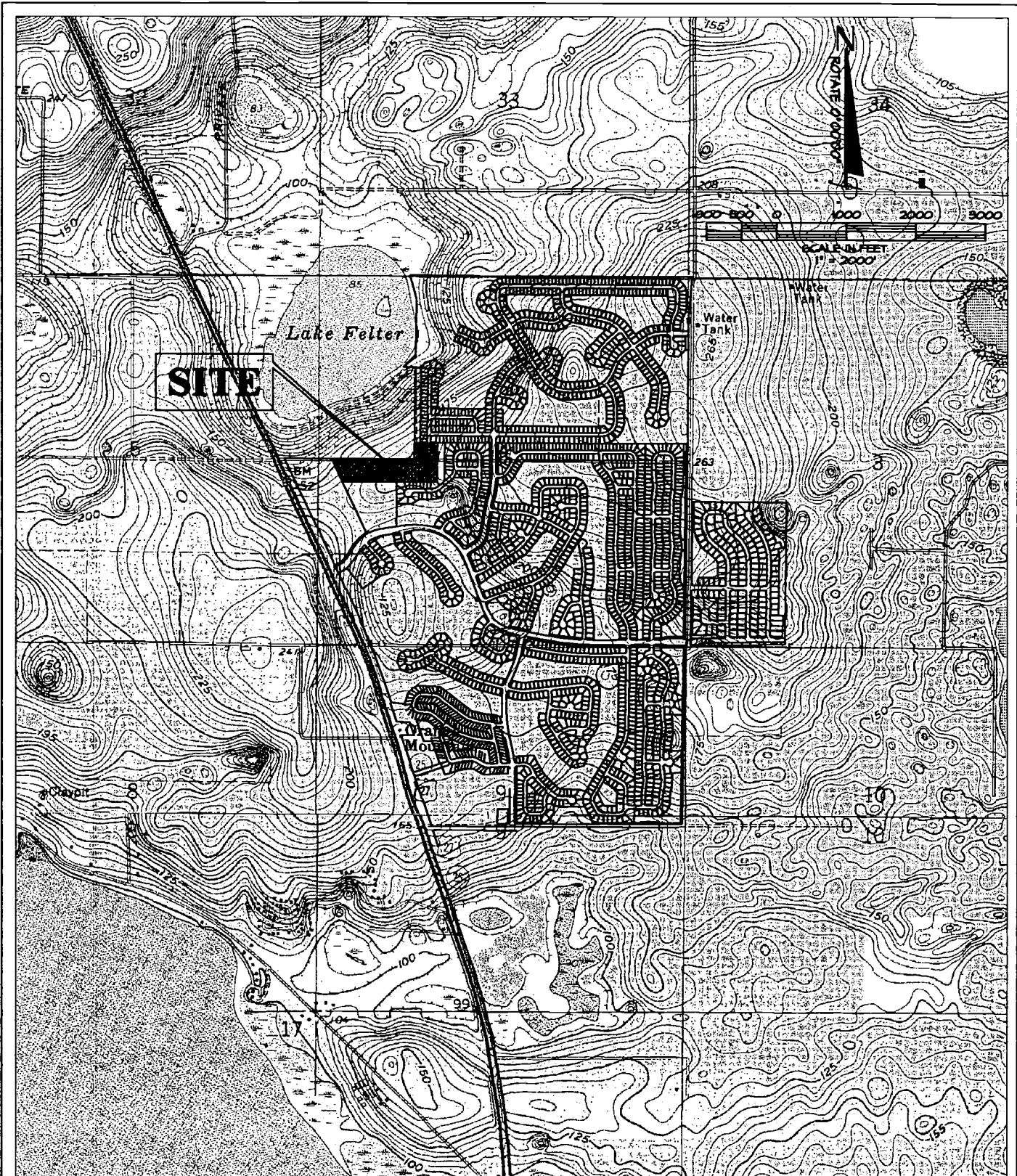
**Aberdeen Phase III Curve Number Calculation**

Homes/Driveways       $14 * 3200 / 43560$       = 1.03 Ac.  
Roads                       $25 * 421 / 43560$       = 0.24 Ac.

Impervious area      = 1.27 Ac.  
Pervious area         = 1.39 Ac.

$$CN = ((0.98 * 1.27) + (0.39 * 1.39)) / 2.66 = 67.2$$

Since the curve number of 55.7 is less than the previously approved 56 we are still in compliance.



**CLERMONT EAST QUADRANGLE FLORIDA  
TOWNSHIP 23 S, RANGE 26 E, SECTION 4**



**FORNER  
& BARLEY**  
AND ASSOCIATES, INC.

- ▲ ENGINEERS
- ▲ SURVEYORS
- ▲ PLANNERS

300 North Central Avenue • Tallahassee, Florida 32379 • (904) 343-8401  
Certificate of Authorization Number: 4708

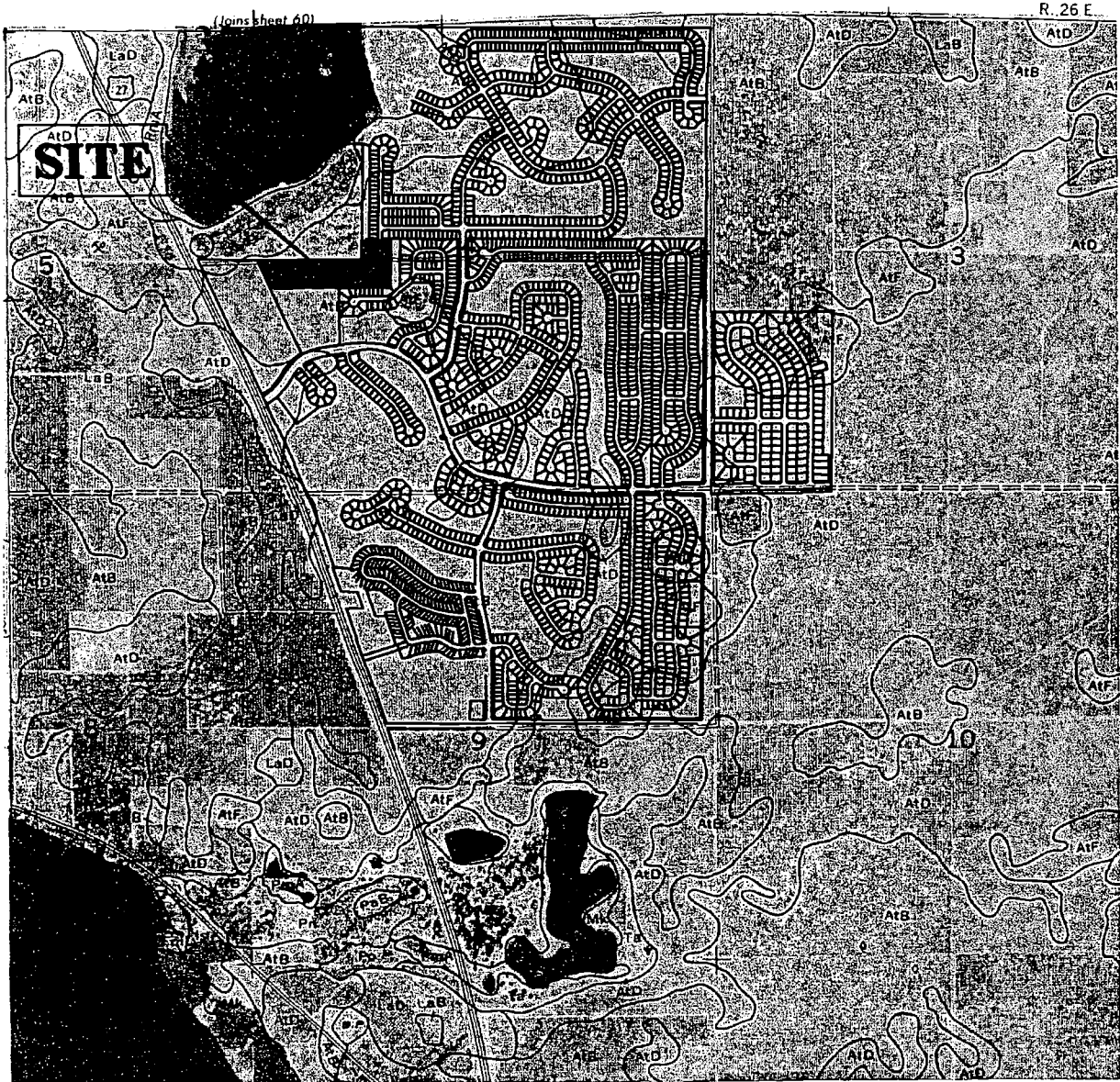
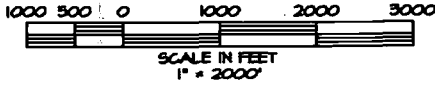
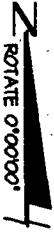
ABERDEEN PHASE III  
AT KINGS RIDGE

USGS Map

DATE: FEB. 2003

FIGURE I-1

JOB NO. 941216141



### LAKE COUNTY , FLORIDA NO. 64



**FARNER  
BEALEY**  
AND ASSOCIATES, INC.

- ▲ ENGINEERS
- ▲ SURVEYORS
- ▲ PLANNERS

350 North Shady Avenue O Titusville, Florida 32780 O (386) 343-8448  
Certificate of Authorization Number: 4708

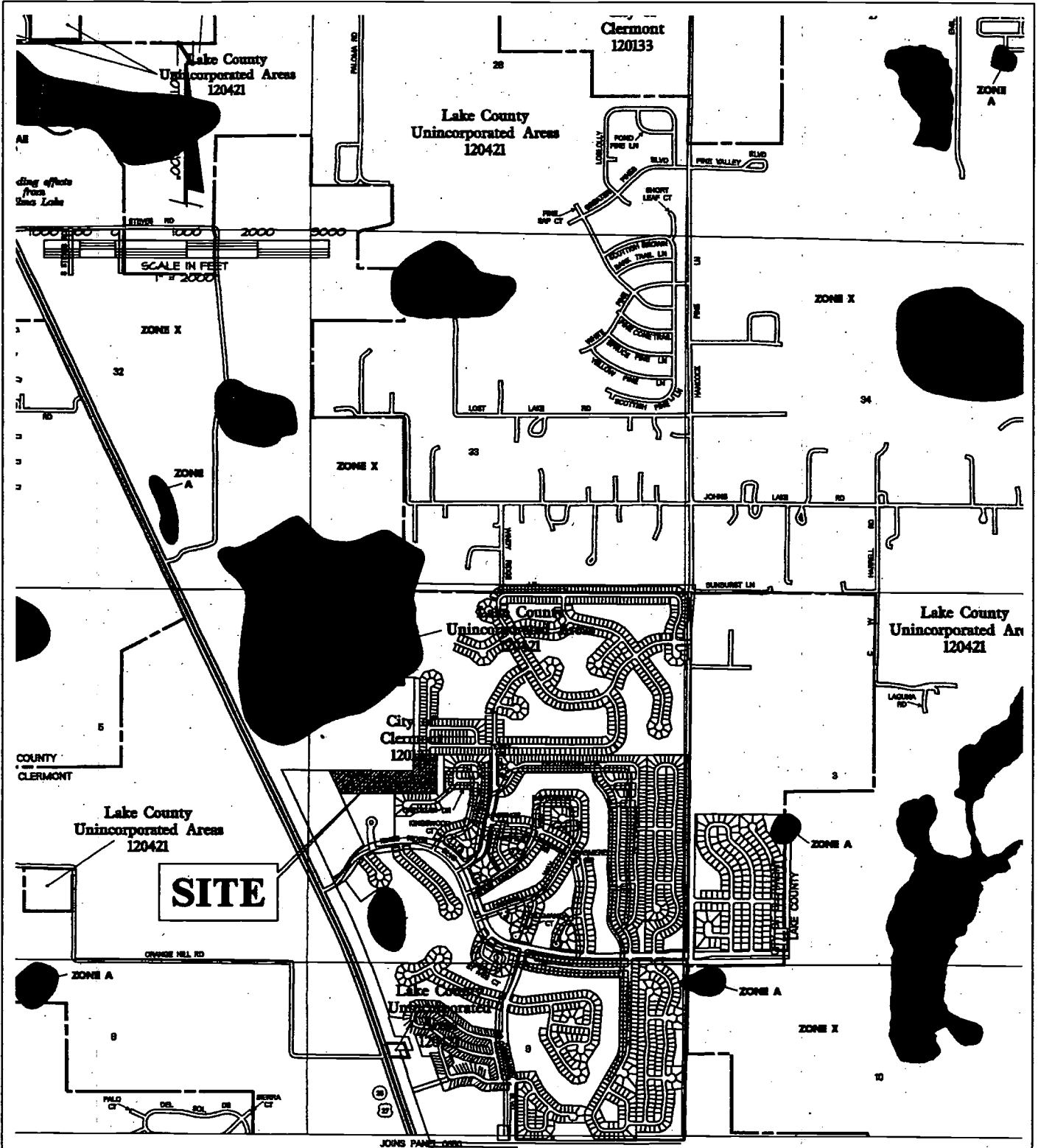
ABERDEEN PHASE III  
AT KINGS RIDGE

Soils Map

DATE: FEB. 2009

FIGURE I-3

JOB NO. 44216.141



**FIRM PANEL #12069CO565 D, LAKE COUNTY, FLORIDA**


**FARNER BARLEY AND ASSOCIATES, INC.**  
 300 North Shaded Avenue O Titusville, Florida 32778 O (321) 343-8481  
 Certificate of Authorization Number: 4708

▲ ENGINEERS  
 ▲ SURVEYORS  
 ▲ PLANNERS

**ABERDEEN PHASE III  
 AT KINGS RIDGE**

Flood Map

DATE: FEB. 2003
FIGURE I-4
JOB NO. 941216.141

**ST. JOHNS RIVER WATER MANAGEMENT DISTRICT  
EXISTING PERMITS**

**KINGS RIDGE NORTH CLUBHOUSE**

**(PERMIT #4-069-19411-13)**

**KINGS RIDGE NORTH**

**(PERMIT #4-069-0326M9-ERP)**

**BASINS 13, 14, 15, AND 16**





POST OFFICE BOX 1429

TELEPHONE 904-329-4500  
TDD 904-329-4450

PALATKA, FLORIDA 32178-1429

SUNCOM 904-880-4500  
TDD SUNCOM 880-4450

FAX (Executive) 329-4125

(Legal) 329-4485

(Permitting) 329-4315

(Administration/Finance) 329-4508

SERVICE CENTERS

618 E. South Street  
Orlando, Florida 32801  
407-897-4300  
TDD 407-897-6980

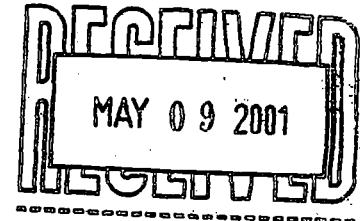
7775 Baymeadows Way  
Suite 102  
Jacksonville, Florida 32256  
904-730-6270  
TDD 804-446-7900

PERMITTING:  
305 East Drive  
Melbourne, Florida 32904  
407-884-4940  
TDD 407-722-5368

OPERATIONS:  
2133 N. Wickham Road  
Melbourne, Florida 32935-8108  
407-752-3100  
TDD 407-752-3102

May 9, 2001

Lennar Land Partners  
1110 Douglas Ave  
Altamonte Springs, FL 32714



SUBJECT: Permit Number 40-069-19411-13  
Kings Ridge North Clubhouse & Spa

Dear Sir/Madam:

Enclosed is your general permit as authorized by the staff of the St. Johns River Water Management District on May 9, 2001.

This permit is a legal document and should be kept with your other important documents. The attached MSSW/Stormwater As-Built Certification Form should be filled in and returned to the Palatka office within thirty days after the work is completed. By so doing, you will enable us to schedule a prompt inspection of the permitted activity.

In addition to the MSSW/Stormwater As-Built Certification Form, your permit also contains conditions which require submittal of additional information. All information submitted as compliance to permit conditions must be submitted to the Palatka office address.

Permit issuance does not relieve you from the responsibility of obtaining permits from any federal, state and/or local agencies asserting concurrent jurisdiction for this work.

Please be advised that the District has not published a notice in the newspaper advising the public that it is issuing a permit for this proposed project. Publication, using the District form, notifies members of the public (third parties) of their rights to challenge the issuance of the general permit. If proper notice is given by publication, third parties have a 21-day time limit on the time they have to file a petition opposing the issuance of the permit. If you do not publish, a party's right to challenge the issuance of the general permit extends for an indefinite period of time. If you wish to have certainty that the period for filing such a challenge is closed, then you may publish, at your own expense, such a notice in a newspaper of general circulation. A copy of the form of the notice and a list of newspapers of general circulation is attached for your use.

In the event you sell your property, the permit will be transferred to the new owner, if we are notified by you within thirty days of the sale and if you provide the information required by 40C-1.612, F.A.C. Please assist us in this matter so as to maintain a valid permit for the new property owner.

William Kerr, CHAIRMAN  
MELBOURNE BEACH

Ometrias D. Long, VICE CHAIRMAN  
APOPKA

Jeff K. Jennings, SECRETARY  
MAYLAND

Duane Ottenstroer, TREASURER  
SWITZERLAND

Dan Roach  
MANDINA BEACH

William M. Segal  
MAYLAND

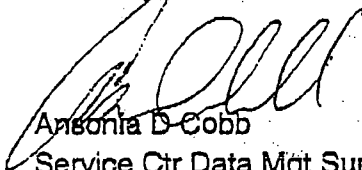
Otis Mason  
ST. AUGUSTINE

Clay Albright  
EAST LAKE WEIR

Reld Hughes  
DAYTONA BEACH

Thank you for your cooperation, and if this office can be of any further assistance to you, please do not hesitate to contact us.

Sincerely,



Ansonia D. Cobb  
Service Ctr Data Mgt Supervis .  
Division of Permit Data Services

Enclosures: Permit with As-built Certification Form  
Notice of Rights  
List of Newspapers for Publication

cc: District Permit File

**Consultant:** Farmer, Barley and Associates, Inc.  
350 N Sinclair Ave  
Tavares, FL 32778

ST. JOHNS RIVER WATER MANAGEMENT DISTRICT  
Post Office Box 1429  
Palatka, Florida 32178-1429

PERMIT NO. 40-069-19411-13

DATE ISSUED: May 9, 2001

PROJECT NAME: Kings Ridge North Clubhouse & Spa

**A PERMIT AUTHORIZING:**

modification to an existing surface water management system, called Kings Ridge, to authorize construction of the Kings Ridge North Clubhouse & Spa, a 10.59-acre project consisting of a clubhouse, pool & spa, and parking lot.

**LOCATION:**

Section(s): 4  
Lake County

Township(s): 23S

Range(s): 26E

**ISSUED TO:**

Lennar Land Partners  
1110 Douglas Ave  
Altamonte Springs, FL 32714

Permittee agrees to hold and save the St. Johns River Water Management District and its successors harmless from any and all damages, claims, or liabilities which may arise from permit issuance. Said application, including all plans and specifications attached thereto, is by reference made a part hereof.

This permit does not convey to permittee any property rights nor any rights of privileges other than those specified therein, nor relieve the permittee from complying with any law, regulation or requirement affecting the rights of other bodies or agencies. All structures and works installed by permittee hereunder shall remain the property of the permittee.

This permit may be revoked, modified or transferred at any time pursuant to the appropriate provisions of Chapter 373, Florida Statutes:

**PERMIT IS CONDITIONED UPON:**

See conditions on attached "Exhibit A", dated May 9, 2001

**AUTHORIZED BY:** St. Johns River Water Management District  
Department of Resource Management

By: Joan B. Budzynski for:  
(Service Center Director - Orlando)  
David A Dewey

**"EXHIBIT A"**  
**CONDITIONS FOR ISSUANCE OF PERMIT NUMBER 40-069-19411-13**  
**LENNAR LAND PARTNERS**  
**DATED MAY 9, 2001**

1. All activities shall be implemented as set forth in the plans, specifications and performance criteria as approved by this permit. Any deviation from the permitted activity and the conditions for undertaking that activity shall constitute a violation of this permit.
2. This permit or a copy thereof, complete with all conditions, attachments, exhibits, and modifications, shall be kept at the work site of the permitted activity. The complete permit shall be available for review at the work site upon request by District staff. The permittee shall require the contractor to review the complete permit prior to commencement of the activity authorized by this permit.
3. Activities approved by this permit shall be conducted in a manner which do not cause violations of state water quality standards.
4. Prior to and during construction, the permittee shall implement and maintain all erosion and sediment control measures (best management practices) required to retain sediment on-site and to prevent violations of state water quality standards. All practices must be in accordance with the guidelines and specifications in chapter 6 of the Florida Land Development Manual: A Guide to Sound Land and Water Management (Florida Department of Environmental Regulation 1988), which are incorporated by reference, unless a project specific erosion and sediment control plan is approved as part of the permit, in which case the practices must be in accordance with the plan. If site specific conditions require additional measures during any phase of construction or operation to prevent erosion or control sediment, beyond those specified in the erosion and sediment control plan, the permittee shall implement additional best management practices as necessary, in accordance with the specifications in chapter 6 of the Florida Land Development Manual: A Guide to Sound Land and Water Management (Florida Department of Environmental 1988). The permittee shall correct any erosion or shoaling that causes adverse impacts to the water resources.
5. Stabilization measures shall be initiated for erosion and sediment control on disturbed areas as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 7 days after the construction activity in that portion of the site has temporarily or permanently ceased.
6. At least 48 hours prior to commencement of activity authorized by this permit, the permittee shall submit to the District a Construction Commencement Notice Form No.

40C-4.900(3) indicating the actual start date and the expected completion date.

7. When the duration of construction will exceed one year, the permittee shall submit construction status reports to the District on an annual basis utilizing an Annual Status Report Form No. 50C-4.900(4). These forms shall be submitted during June of each year.
8. For those systems which will be operated or maintained by an entity which will require an easement or deed restriction in order to provide that entity with the authority necessary to operate or maintain the system, such easement or deed restriction, together with any other final operation or maintenance documents as are required by subsections 7.1.1 through 7.1.4 of the Applicant's Handbook: Management and Storage of Surface Waters, must be submitted to the District for approval. Documents meeting the requirements set forth in these subsections of the Applicant's Handbook will be approved. Deed restrictions, easements and other operation and maintenance documents which require recordation either with the Secretary of State or the Clerk of the Circuit Court must be so recorded prior to lot or unit sales within the project served by the system, or upon completion of construction of the system, whichever occurs first. For those systems which are proposed to be maintained by county or municipal entities, final operation and maintenance documents must be received by the District when maintenance and operation of the system is accepted by the local governmental entity. Failure to submit the appropriate final documents referenced in this paragraph will result in the permittee remaining liable for carrying out maintenance and operation of the permitted system.
9. Each phase or independent portion of the permitted system must be completed in accordance with the permitted plans and permit conditions prior to the initiation of the permitted use of site infrastructure located within the area served by the portion or phase of the system. Each phase or independent portion of the system must be completed in accordance with the permitted plans and permit conditions prior to transfer of responsibility for operation and maintenance of that phase or portion of the system to local government or other responsible entity.
10. Within 30 days after completion of construction of the permitted system, or independent portion of the system, the permittee shall submit a written statement of completion and certification by a registered professional engineer or other appropriate individual as authorized by law, utilizing As Built Certification Form 40C-1.181(13) or 40C-1.181(14) supplied with this permit. When the completed system differs substantially from the permitted plans, any substantial deviations shall be noted and explained and two copies of as-built drawings submitted to the District. Submittal of the completed form shall serve to notify the District that the system is ready for inspection. The statement of completion and certification shall be based on on-site observation of construction

(conducted by the registered professional engineer, or other appropriate individual as authorized by law, or under his or her direct supervision) or review of as-built drawings for the purpose of determining if the work was completed in compliance with approved plans and specifications. As-built drawings shall be the permitted drawings revised to reflect any changes made during construction. Both the original and any revised specifications must be clearly shown. The plans must be clearly labeled as "as-built" or "record" drawing. All surveyed dimensions and elevations shall be certified by a registered surveyor. The following information, at a minimum, shall be verified on the as-built drawings:

1. Dimensions and elevations of all discharge structures including all weirs, slots, gates, pumps, pipes, and oil and grease skimmers;
  2. Locations, dimensions, and elevations of all filter, exfiltration, or underdrain systems including cleanouts, pipes, connections to control structures, and points of discharge to the receiving waters;
  3. Dimensions, elevations, contours, or cross-sections of all treatment storage areas sufficient to determine state-storage relationships of the storage area and the permanent pool depth and volume below the control elevation for normally wet systems, when appropriate;
  4. Dimensions, elevations, contours, final grades, or cross-sections of the system to determine flow directions and conveyance of runoff to the treatment system;
  5. Dimensions, elevations, contours, final grades, or cross-sections of all conveyance systems utilized to convey off-site runoff around the system;
  6. Existing water elevation(s) and the date determined; and Elevation and location of benchmark(s) for the survey.
11. The operation phase of this permit shall not become effective until the permittee has complied with the requirements of general condition 9 above, the District determines the system to be in compliance with the permitted plans, and the entity approved by the District in accordance with subsections 7.1.1 through 7.1.4 of the Applicant's Handbook: Management and Storage of Surface Waters, accepts responsibility for operation and maintenance of the system. The permit may not be transferred to such an approved operation and maintenance entity until the operation phase of the permit becomes effective. Following inspection and approval of the permitted system by the District, the permittee shall request transfer of the permit to the responsible approved operation

and maintenance entity, if different from the permittee. Until the permit is transferred pursuant to section 7.1 of the Applicant's Handbook: Management and Storage of Surface Waters, the permittee shall be liable for compliance with the terms of the permit.

12. Should any other regulatory agency require changes to the permitted system, the permittee shall provide written notification to the District of the changes prior implementation so that a determination can be made whether a permit modification is required.
13. This permit does not eliminate the necessity to obtain any required federal, state, local and special district authorizations prior to the start of any activity approved by this permit. This permit does not convey to the permittee or create in the permittee any property right, or any interest in real property, nor does it authorize any entrance upon or activities on property which is not owned or controlled by the permittee, or convey any rights or privileges other than those specified in the permit and chapter 40C-4 or chapter 40C-40, F.A.C.
14. The permittee shall hold and save the District harmless from any and all damages, claims, or liabilities which may arise by reason of the activities authorized by the permit or any use of the permitted system.
15. Any delineation of the extent of a wetland or other surface water submitted as part of the permit application, including plans or other supporting documentation, shall not be considered specifically approved unless a specific condition of this permit or a formal determination under section 373.421(2), F.S., provides otherwise.
16. The permittee shall notify the District in writing within 30 days of any sale, conveyance, or other transfer of ownership or control of the permitted system or the real property at which the permitted system is located. All transfers of ownership or transfers of a permit are subject to the requirements of section 40C-1.612, F.A.C. The permittee transferring the permit shall remain liable for any corrective actions that may be required as a result of any permit violations prior to such sale, conveyance or other transfer.
17. Upon reasonable notice to the permittee, District authorized staff with proper identification shall have permission to enter, inspect, sample and test the system to insure conformity with the plans and specifications approved by the permit.
18. If historical or archaeological artifacts are discovered at any time on the project site, the permittee shall immediately notify the District.

19. The permittee shall immediately notify the District in writing of any previously submitted information that is later discovered to be inaccurate.
20. This permit for construction will expire five years from the date of issuance.
21. All wetland areas or water bodies that are outside the specific limits of construction authorized by this permit must be protected from erosion, siltation, scouring or excess turbidity, and dewatering.
22. Prior to construction, the permittee must clearly designate the limits of construction on-site. The permittee must advise the contractor that any work outside the limits of construction, including clearing, may be a violation of this permit.
23. The proposed surface water management system must be constructed and operated in accordance with the plans signed and sealed by the engineer on April 9, 2001 and received by the District on April 10, 2001.



## Notice Of Rights

1. A person whose substantial interests are or may be determined has the right to request an administrative hearing by filing a written petition with the St. Johns River Water Management District (District), or may choose to pursue mediation as an alternative remedy under Sections 120.569 and 120.573, Florida Statutes, before the deadline for filing a petition. Choosing mediation will not adversely affect the rights to a hearing if mediation does not result in a settlement. The procedures for pursuing mediation are set forth in Sections 120.569 and 120.57, Florida Statutes, and Rules 28-106.111 and 28-106.401-405, Florida Administrative Code. Pursuant to Chapter 28-106 and Rule 40C-1.1007, Florida Administrative Code, the petition must be filed at the office of the District Clerk at District Headquarters, P. O. Box 1429, Palatka, Florida 32178-1429 (4049 Reid St., Palatka, FL 32177) within twenty-six (26) days of the District depositing notice of District decision in the mail (for those persons to whom the District mails actual notice) or within twenty-one (21) days of newspaper publication of the notice of District decision (for those persons to whom the District does not mail actual notice). A petition must comply with Chapter 28-106, Florida Administrative Code.
2. If the Governing Board takes action which substantially differs from the notice of District decision, a person whose substantial interests are or may be determined has the right to request an administrative hearing or may choose to pursue mediation as an alternative remedy as described above. Pursuant to District Rule 40C-1.1007, Florida Administrative Code, the petition must be filed at the office of the District Clerk at the address described above, within twenty-six (26) days of the District depositing notice of final District decision in the mail (for those persons to whom the District mails actual notice) or within twenty-one (21) days of newspaper publication of the notice of its final agency action (for those persons to whom the District does not mail actual notice). Such a petition must comply with Rule Chapter 28-106, Florida Administrative Code.
3. A substantially interested person has the right to a formal administrative hearing pursuant to Section 120.569 and 120.57(1), Florida Statutes, where there is a dispute between the District and the party regarding an issue of material fact. A petition for formal hearing must comply with the requirements set forth in Rule 28-106.201, Florida Administrative Code.
4. A substantially interested person has the right to an informal hearing pursuant to Sections 120.569 and 120.57(2), Florida Statutes, where no material facts are in dispute. A petition for an informal hearing must comply with the requirements set forth in Rule 28-106.301, Florida Administrative Code.
5. A petition for an administrative hearing is deemed filed upon delivery of the petition to the District Clerk at the District headquarters in Palatka, Florida.
6. Failure to file a petition for an administrative hearing, within the requisite time frame shall constitute a waiver of the right to an administrative hearing (Section 28-106.111, Florida Administrative Code).
7. The right to an administrative hearing and the relevant procedures to be followed are governed by Chapter 120, Florida Statutes, and Chapter 28-106, Florida Administrative Code and Section 40C-1.1007, Florida Administrative Code.

### Notice Of Rights

8. An applicant with a legal or equitable interest in real property who believes that a District permitting action is unreasonable or will unfairly burden the use of his property, has the right to, within 30 days of receipt of notice of the District's written decision regarding a permit application, apply for a special master proceeding under Section 70.51, Florida Statutes, by filing a written request for relief at the office of the District Clerk located at District headquarters, P. O. Box 1429, Palatka, FL 32178-1429 (4049 Reid St., Palatka, Florida 32177). A request for relief must contain the information listed in Subsection 70.51(6), Florida Statutes.
9. A timely filed request for relief under Section 70.51, Florida Statutes, tolls the time to request an administrative hearing under paragraph no. 1 or 2 above (Paragraph 70.51(10)(b), Florida Statutes). However, the filing of a request for an administrative hearing under paragraph no. 1 or 2 above waives the right to a special master proceeding (Subsection 70.51(10)(b), Florida Statutes).
10. Failure to file a request for relief within the requisite time frame shall constitute a waiver of the right to a special master proceeding (Subsection 70.51(3), Florida Statutes).
11. Any substantially affected person who claims that final action of the District constitutes an unconstitutional taking of property without just compensation may seek review of the action in circuit court pursuant to Section 373.617, Florida Statutes, and the Florida Rules of Civil Procedures, by filing an action in circuit court within 90 days of the rendering of the final District action, (Section 373.617, Florida Statutes).
12. Pursuant to Section 120.68, Florida Statutes, a person who is adversely affected by final District action may seek review of the action in the District Court of Appeal by filing a notice of appeal pursuant to the Florida Rules of Appellate Procedure within 30 days of the rendering of the final District action.
13. A party to the proceeding before the District who claims that a District order is inconsistent with the provisions and purposes of Chapter 373, Florida Statutes, may seek review of the order pursuant to Section 373.114, Florida Statutes, by the Florida Land and Water Adjudicatory Commission, by filing a request for review with the Commission and serving a copy on the Department of Environmental Protection and any person named in the order within 20 days of adoption of a rule or the rendering of the District order.
14. For appeals to the District Court of Appeal, a District action is considered rendered after it is signed on behalf of the District, and is filed by the District Clerk.
15. Failure to observe the relevant time frames for filing a petition for judicial review described in paragraphs #11 and #12, or for Commission review as described in paragraph #13, will result in waiver of that right to review.

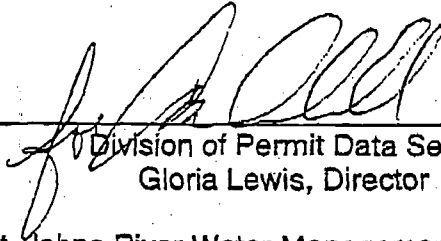
**Notice Of Rights**

**Certificate of Service**

I HEREBY CERTIFY that a copy of the foregoing Notice of Rights has been sent by U.S. Mail to:

Lennar Land Partners  
1110 Douglas Ave.  
Altamonte Springs, FL 32714

at 4:00 p.m. this 9th day of May, 2001.

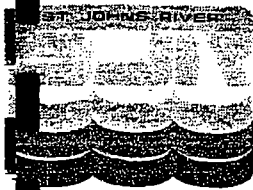


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Division of Permit Data Services  
Gloria Lewis, Director

St. Johns River Water Management District  
Post Office Box 1429  
Palatka, FL 32178-1429  
(904) 329-4152

Permit Number: 40-069-19411-13



**WATER  
MANAGEMENT  
DISTRICT**

Henry Dean, Executive Director  
John R. Wehle, Assistant Executive Director

**POST OFFICE BOX 1429**

**PALATKA, FLORIDA 32178-1429**

TELEPHONE 904-329-4500 1-800-451-7106 SUNCOM 904-860-4500  
TDD 904-329-4450 TDD SUNCOM 860-4450  
FAX (Executive) 329-4125 (Legal) 329-4485 (Permitting) 329-4315 (Administration/Finance) 329-4508

818 E. South Street  
Orlando, Florida 32801  
407-897-4300  
1-877-228-1658  
FAX 407-897-4354  
TDD 407-897-5960

7775 Baymeadows Way  
Suite 102  
Jacksonville, Florida 32256  
904-730-6270  
1-800-852-1563  
FAX 904-730-6287  
TDD 904-448-7900

**SERVICE CENTERS**

**PERMITTING:**  
305 East Drive  
Melbourne, Florida 32904  
407-984-4940  
1-800-295-3284  
FAX 407-722-5357  
TDD 407-722-5388

**OPERATIONS:**  
2133 N. Wickham Road  
Melbourne, Florida 32935-8109  
407-752-3100  
TDD 407-752-3102

April 11, 2000

Lennar Land Partners  
ATTN: Robert Ahrens  
7600 Nob Hill  
Tamarac, FL 33321

SUBJECT: Management and Storage of Surface Waters Individual  
Permit Number 4-069-0326M9-ERP

Dear Sir:

Enclosed is your permit as authorized by the Governing Board of the St. Johns River Water Management District on April 11, 2000.

This permit is a legal document and should be kept with your other important documents. The attached MSSW/Stormwater As-Built Certification Form should be filled in and returned to the Palatka office within thirty days after the work is completed. By so doing, you will enable us to schedule a prompt inspection of the permitted activity.

In addition to the MSSW/Stormwater As-Built Certification Form, your permit also contains conditions which require submittal of additional information. All information submitted as compliance to permit conditions must be submitted to the Palatka office address.

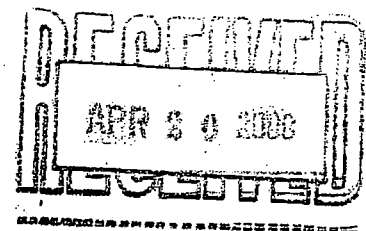
Permit issuance does not relieve you from the responsibility of obtaining permits from any federal, state and/or local agencies asserting concurrent jurisdiction for this work.

In the event you sell your property, the permit will be transferred to the new owner, if we are notified by you within thirty days of the sale. Please assist us in this matter so as to maintain a valid permit for the new property owner.

Thank you for your cooperation and if this office can be of any further assistance to you, please do not hesitate to contact us.

Sincerely,

Quen Johnson, Data Control Technician  
Permit Data Services Division



Enclosures: Permit with EN form(s), if applicable

cc: District Permit File

Farner Barley & Associates Inc.

ATTN: Duane K. Booth, PE, 350 North Sinclair Avenue, Tavares, FL, 32778

William Kerr, CHAIRMAN  
MELBOURNE BEACH

Ometrias D. Long, VICE CHAIRMAN  
APOPKA

Jeff K. Jennings, SECRETARY  
MAYLAND

Duane Ottenstroer, TREASURER  
SWITZERLAND

Dan Roach  
FERNANDINA BEACH

William M. Segal  
MAYLAND

Otis Mason  
ST. AUGUSTINE

Clay Albright  
EAST LAKE WEIR

Reid Hughes  
DAYTONA BEACH

**ST. JOHNS RIVER WATER MANAGEMENT DISTRICT**  
Post Office Box 1429  
Palatka, Florida 32178-1429

**PERMIT NO.** 4-069-0326M9-ERP,

**DATE ISSUED** April 11, 2000

**A PERMIT AUTHORIZING:**

This permit is for the construction of a surface water management system consisting of mass grading for a future golf course residential community, including construction of two lined wet retention ponds, and nine dry retention ponds in 228.80 acres of area known as Kings Ridge North.

**LOCATION:** Section(s) 4, Township 23 South, Range 26 East

**COUNTY:** Lake

**ISSUED TO:**  
(owner)

Lennar Land Partners  
7600 Nob Hill  
Tamarac, FL 33321

Permittee agrees to hold and save the St. Johns River Water Management District and its successors harmless from any and all damages, claims, or liabilities which may arise from permit issuance. Said application, including all plans and specifications attached thereto, is by reference made a part hereof.

This permit does not convey to permittee any property rights nor any rights or privileges other than those specified herein, nor relieve the permittee from complying with any law, regulation or requirement affecting the rights of other bodies or agencies. All structures and works installed by permittee hereunder shall remain the property of the permittee.

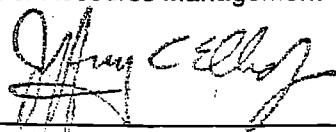
This Permit may be revoked, modified or transferred at any time pursuant to the appropriate provisions of Chapter 373, Florida Statutes:

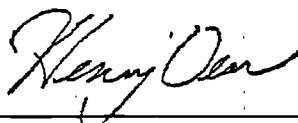
**PERMIT IS CONDITIONED UPON:**

See conditions on attached "Exhibit A", dated April 11, 2000

**AUTHORIZED BY:** St. Johns River Water Management District

Department of Resource Management Governing Board

By:   
\_\_\_\_\_  
(DIRECTOR)  
JEFF ELLEDGE

By:   
\_\_\_\_\_  
(ASSISTANT SECRETARY)  
HENRY DEAN

**"EXHIBIT A"**

**Lennar Land Partners**

**April 11, 2000**

**4-069-0326M9-ERP**

1. All activities shall be implemented as set forth in the plans, specifications and performance criteria as approved by this permit. Any deviation from the permitted activities and the conditions for undertaking that activity shall constitute a violation of this permit.
2. This permit or a copy thereof, complete with all conditions, attachments, exhibits, and modifications, shall be kept at the work site of the permitted activity. The complete permit shall be available for review at the work site upon request by District staff. The permittee shall require the contractor to review the complete permit prior to commencement of the activity authorized by this permit.
3. Activities approved by this permit shall be conducted in a manner, which do not cause violations of state water quality standards.
4. Prior to and during construction, the permittee shall implement and maintain all erosion and sediment control measures (best management practices) required to retain sediment on-site and to prevent violations of state water quality standards. All practices must be in accordance with the guidelines and specifications in Chapter 6 of the Florida Land Development Manual: A Guide to Sound Land and Water Management (Florida Department of Environmental Regulation 1988), which are incorporated by reference, unless a project specific erosion and sediment control plan is approved as part of the permit, in which case the practices must be in accordance with the plan. If site specific conditions require additional measures during any phase of construction or operation to prevent erosion or control sediment, beyond those specified in the erosion and sediment control plan, the permittee shall implement additional best management practices as necessary, in accordance with the specifications in Chapter 6 of the Florida Land Development Manual: A Guide To Sound Land and Water Management (Florida Department of Environmental Regulation 1988). The permittee shall correct any erosion or shoaling that causes adverse impacts to the water resources.
5. Stabilization measures shall be initiated for erosion and sediment control on disturbed areas as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 7 days after the construction activity in that portion of the site has temporarily or permanently ceased.
6. At least 48 hours prior to commencement of activity authorized by this permit, the permittee shall submit to the District a Construction Commencement Notice Form No. 40C-4.900(3) indicating the actual start date and the expected completion date.
7. When the duration of construction will exceed one year, the permittee shall submit construction status reports to the District on an annual basis utilizing an annual Status Report Form No. 40C-4.900(4). These forms shall be submitted during June of each year.

8. For those systems which will be operated or maintained by an entity which will require an easement or deed restriction in order to provide that entity with the authority necessary to operate or maintain the system, such easement or deed restriction, together with any other final operation or maintenance documents as are required by Subsections 7.1.1. through 7.1.4 of the Applicant's Handbook: Management and Storage of Surface Waters, must be submitted to the District for approval. Documents meeting the requirements set forth in these Subsections of the Applicants Handbook will be approved. Deed restrictions, easements and other operation and maintenance documents which require recordation either with the Secretary of State or the Clerk of the Circuit Court must be so recorded prior to lot or unit sales within the project served by the system, or upon completion of construction of the system, whichever occurs first. For those systems which are proposed to be maintained by county or municipal entities, final operation and maintenance documents must be received by the District when maintenance operation of the system is accepted by the local governmental entity. Failure to submit the appropriate final documents referenced in this paragraph will result in the permittee remaining liable for carrying out maintenance and operation of the permitted system.
9. Each phase or independent portion of the permitted system must be completed in accordance with the permitted plans and permit conditions prior to the initiation of the permitted use of site infrastructure located within the area served by that portion or phase of the system. Each phase or independent portion of the system must be completed in accordance with the permitted plans and permit conditions prior to transfer of responsibility for operation and maintenance of that phase or portion of the system to a local government.
10. Within 30 days after completion of construction of the permitted system, or independent portion of the system, the certification by a registered professional engineer or other appropriate individual as authorized by law, utilizing As-Built Certification Form 40C-1.81(13) or 40C-1.181(14) supplied with this permit. When the completed system differs substantially from the permitted plans, any substantial deviations shall be noted and explained and two copies of as-built drawings submitted to the District. Submittal of the completed form shall serve to notify the District that the system is ready for inspection. Statement of completion and certification shall be based on the on-site observation of construction (conducted by the registered professional engineer, or other appropriate individual as authorized by law, or under his her direct supervision) or review of as-built drawings for the purpose of determining if the work was completed in compliance with approved plans and specifications. As-built drawings shall be the permitted drawings revised to reflect any changes made during construction. Both the original and any revised specifications must be clearly shown. The plans must be clearly labeled as "as-built" or "record" drawing. All surveyed dimensions and elevations shall be certified by a registered surveyor. The following information, at a minimum, shall be certified on the as-built drawings:
  - A. Dimensions and elevations of all discharge structures including all weirs, slots, gates, pumps, pipes, and oil and grease skimmers;
  - B. Locations, dimensions, and elevations of all filter, exfiltration, or underdrain systems including cleanouts, pipes, connections to control structures, and points of discharge to the receiving waters;

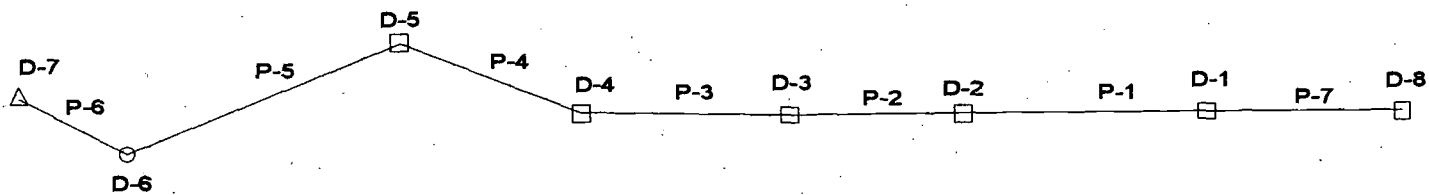
- C. Dimensions, elevations, contours, or cross-sections of all treatment storage areas sufficient to determine stage-storage relationships of the storage area and the permanent pool depth and volume below the control elevation for normally wet systems, when appropriate;
  - D. Dimensions, elevations, contours, final grades, or cross-sections of the system to determine flow directors and conveyance of runoff to the treatment system;
  - E. Dimensions, elevations, contours, final grades, or cross-sections of all conveyance systems utilized to convey off-site runoff around the system;
  - F. Existing water elevations(s) and the date determined; and
  - G. Elevation and location of benchmark(s) for the survey.
11. The operation phase of this permit shall not become effective until the permittee has complied with the requirements of general condition no. 9 above, the District determines the system to be in compliance with the permitted plans, and the entity approved by the District in accordance with Subsections 7.1.1. through 7.1.4 of the Applicants Handbook: Management and Storage of Surface Waters, accepts responsibility for operation and maintenance of the system. The permit may not be transferred to such an approved operation and maintenance entity until the operation phase of the permit become effective. Following inspection and approval of the permitted system by the District, the permittee shall request transfer of the permit to the responsible approved operation and maintenance entity, if different from the permittee. Until the permit is transferred pursuant to Section 7.1 of the Applicants Handbook: Management and Storage of Surface Waters, the permittee shall be liable for compliance with the terms of the permit.
12. Should any other regulatory agency require changes to the permitted system, the permittee shall provide written notification to the District of the changes prior to implementation so that a determination can be made whether a permit modification is required.
13. This permit does not eliminate the necessity to obtain any required federal, state, local and special district authorizations prior to the start of any activity approved by this permit. This permit does not convey to the permittee or create in the permittee any property right, or any interest in real property, nor does it authorize any entrance upon or activities on property which is not owned or controlled by the permittee, or convey any rights or privileges other than those specified in the permit and Chapter 40C-4 or Chapter 40C-40, F.A.C.
14. The permittee shall hold and save the District harmless from any and all damages, claims, or liabilities which may arise by reason of the activities authorized by the permit or any use of the permitted system.



15. Any delineation of the extent of a wetland or other surface water submitted as part of the permit application, including plans or other supporting documentation, shall not be considered specifically approved unless a specific condition of this permit or a formal determination under Section 373.421(2), F.S., provides otherwise.
16. The permittee shall notify the District in writing within 30 days of any sale, conveyance, or other transfer or ownership or control of the permitted system or the real property at which the permitted system is located. All transfers of ownership or transfers of a permit are subject to the requirements of Section 40C-1.612, F.A.C. The permittee transferring the permit shall remain liable for any corrective actions that may be required as a result of any permit violations prior to the sale conveyance or other transfer.
17. Upon reasonable notice to the permittee, District authorized staff with proper identification shall have permission to enter, inspect, sample and test the system to insure conformity with the plans and specifications approved by the permit.
18. If historical or archeological artifacts are discovered at any time on the project site, the permittee shall immediately notify the District.
19. The permittee shall immediately notify the District in writing of any previously submitted information that is later discovered to be inaccurate.
20. This permit for construction will expire five years from the date of issuance.
21. At a minimum, all retention and detention storage areas must be excavated to rough grade prior to building construction or placement of impervious surface within the area to be served by those facilities. To prevent reduction in storage volume and percolation rates, all accumulated sediment must be removed from the storage area prior to final grading and stabilization.
22. All wetland areas or water bodies that are outside the specific limits of construction authorized by this permit must be protected from erosion, siltation, scouring or excess turbidity, and dewatering.
23. Prior to construction, the permittee must clearly designate the limits of construction on-site. The permittee must advise the contractor that any work outside the limits of construction, including clearing, may be a violation of this permit.
24. Within 90 days of permit issuance, the Permittee must obtain District approval of a site specific, integrated Pesticides Management Plan. The management plan must specify the usage of non-chemical or cultural means as the primary defense against nuisance and/or destructive pests. These non-chemical measures should include practices such as: the planting and maintenance of native vegetation where possible; the use of pest and/or disease tolerant vegetation; the proper selection and application of fertilizer; proper supplemental watering; the use of mulch for weed control, and proper maintenance practices including mowing frequency, mowing height, mechanical dethatching, removal of dying or dead vegetation, etc. The plan must also include information on the following: A. Insecticides, nematicides, fungicides or herbicides to be used; B. Method(s) of application; C. Time

- frames for use and application; and D. For the pesticides that will be used, specification of: - Half-lives - N-Octanol/water partition coefficient (Kow) - Lethal dose coefficient (LD50) - Solubility Any pesticides selected must exhibit a short half-life (<10 weeks), a low n-octanol/water coefficient (<5.0), and be suitable for use with local soils and groundwater pH conditions. The use of organochlorides and other pesticides either listed by EPA as canceled or suspended, or otherwise prohibited by state or federal law is not allowed.
25. The permittee must adhere to the fertilizer recommendations set forth in the manual for commercial turf grass management by the University of Florida compiled by the Florida Turf-Grass Association. The nutrient loading attributable to the application of effluent shall be considered a source of fertilizer for the golf course and additional non-effluent fertilizer sources shall be utilized only as a supplement.
  26. The operation and maintenance entity shall submit inspection reports to the District two years after the operation phase permit becomes effective and every two years thereafter on District form EN-46. The inspection form must be signed and sealed by an appropriate registered professional.
  27. The proposed surface water management system must be constructed as per the plans received by the District on January 24, 2000.
  28. This permit does not authorize construction of any impervious surface, or any other work not shown on the plans referenced above.
  29. The permittee may obtain a Standard General Environmental Resource Permit (ERP) for future phases of the King Ridge North when the phase is consistent with this permit and does not exceed the thresholds pursuant to 40C-40.302(2), F.A.C. If a phase exceeds the thresholds pursuant to 40C-40.302 (2), F.A.C. or if a phase is inconsistent with this permit, the permittee must obtain a modification to this permit.
  30. The operation and maintenance entity must maintain the retention pond in the surface water management system as per the maintenance plan developed by the design professional.
  31. Contained within the as-built report, the permittee must submit a soil analysis of the base of retention ponds verifying that the design permeability rates are provided for each phase of the construction. If the design permeability rates cannot be verified, the permittee must obtain a modification of this permit demonstrating that the design criteria and objectives of Chapter 40C-4, F.A.C. are met.
  32. The operation and maintenance entity shall submit inspection reports to the District one year after the operation phase permit becomes effective and every year thereafter on District form EN-46 for each phase of the construction. The inspection form must be signed and sealed by an appropriate registered professional, and must include the results of permeability tests of the base of the retention ponds verifying that the design permeabilities are met. After three consecutive inspection reports confirm the design permeabilities for a phase of the construction, the entity will no longer be required to submit permeability test results and the inspection report requirement shall be amended to every two years for the said phase. If the design permeability rates cannot be verified, the permittee must obtain a modification to the permit demonstrating that the design criteria of Chapter 40C-4 F.A.C. are met.

**STORM SEWER SYSTEM ANALYSIS  
BASIN 14**



Project Title: ABERDEEN PHASE 3 AT KINGS RIDGE

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FARNER BARLEY & ASSOC.

Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666

Project Engineer: FARNER BARLEY & ASSOC.

StormCAD v1.0

Page 1 of 1

## DOT Report

-Node- Upstream Downstream	Length (ft)	Inlet Area (acres)	Inlet C	Total CA (acres)	Inlet TC (min)	System Flow Time (min)	Inlet Discharge (cfs)	-Ground- Upstream Downstream (ft)	-HGL- Upstream Downstream (ft)	-Slope- Energy Constructed (ft/ft)	Section Size	-Section- Discharge Capacity (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Average Velocity (ft/s)
D-8	242.00	0.72	0.60	0.43	10.00	10.00	3.38	179.49	175.20	0.011660	18 inch	3.38	171.60	174.50	3.60
D-1								176.64	172.51	0.011983		11.50			
D-1	202.00	0.14	0.65	0.52	10.00	11.12	0.71	176.64	172.36	0.009782	18 inch	3.93	169.45	171.60	3.60
D-2								174.45	170.56	0.010644		10.84			
D-2	152.00	0.39	0.65	0.78	10.00	12.06	1.98	174.45	170.37	0.008783	18 inch	5.64	167.92	169.45	4.21
D-3								172.74	169.23	0.010066		10.54			
D-3	248.00	0.45	0.65	1.07	10.00	12.66	2.29	172.74	168.99	0.022152	18 inch	7.59	162.00	167.92	7.34
D-4								166.04	162.72	0.023871		16.23			
D-4	104.00	0.65	0.65	1.49	10.00	13.22	3.30	166.04	157.24	0.016824	18 inch	10.36	153.92	156.00	6.25
D-5								161.75	155.64	0.020000		14.85			
D-5	160.00	0.58	0.60	1.84	10.00	13.50	2.72	161.75	155.20	0.029840	24 inch	12.64	148.00	153.92	8.98
D-6								160.50	148.74	0.037000		43.51			
D-6	77.00	N/A	N/A	1.84	N/A	13.80	N/A	160.50	148.04	0.004439	24 inch	12.49	144.00	144.77	4.95
D-7								151.00	146.00	0.010000		22.62			

### Combined Pipe/Node Report

Pipe	Upstream Node	Downstream Node	Length (ft)	Inlet Area (acres)	Inlet C	Inlet CA (acres)	Total CA (acres)	Inlet Discharge (cfs)	Section Size	Capacity (cfs)	Average Velocity (ft/s)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Inlet TC (min)	Section Material
P-7	D-8	D-1	242.00	0.72	0.60	0.43	0.43	3.38	18 inch	11.50	3.60	174.50	171.60	0.011983	10.00	Concrete
P-1	D-1	D-2	202.00	0.14	0.65	0.09	0.52	0.71	18 inch	10.84	3.60	171.60	169.45	0.010644	10.00	Concrete
P-2	D-2	D-3	152.00	0.39	0.65	0.25	0.78	1.98	18 inch	10.54	4.21	169.45	167.92	0.010066	10.00	Concrete
P-3	D-3	D-4	248.00	0.45	0.65	0.29	1.07	2.29	18 inch	16.23	7.34	167.92	162.00	0.023871	10.00	Concrete
P-4	D-4	D-5	104.00	0.65	0.65	0.42	1.49	3.30	18 inch	14.85	6.25	156.00	153.92	0.020000	10.00	Concrete
P-5	D-5	D-6	160.00	0.58	0.60	0.35	1.84	2.72	24 inch	43.51	8.98	153.92	148.00	0.037000	10.00	Concrete
P-6	D-6	D-7	77.00	N/A	N/A	N/A	1.84	N/A	24 inch	22.62	4.95	144.77	144.00	0.010000	N/A	Concrete

### Combined Pipe/Node Report

Pipe	Upstream Node	Downstream Node	Length (ft)	Inlet Area (acres)	Inlet C	Inlet CA (acres)	Total CA (acres)	Inlet Discharge (cfs)	Section Size	Capacity (cfs)	Average Velocity (ft/s)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Inlet TC (min)	Section Material
P-7	D-8	D-1	242.00	0.72	0.60	0.43	0.43	1.74	18 inch	11.50	2.89	174.50	171.60	0.011983	10.00	Concrete
P-1	D-1	D-2	202.00	0.14	0.65	0.09	0.52	0.37	18 inch	10.84	2.90	171.60	169.45	0.010644	10.00	Concrete
P-2	D-2	D-3	152.00	0.39	0.65	0.25	0.78	1.02	18 inch	10.54	3.35	169.45	167.92	0.010066	10.00	Concrete
P-3	D-3	D-4	248.00	0.45	0.65	0.29	1.07	1.18	18 inch	16.23	6.14	167.92	162.00	0.023871	10.00	Concrete
P-4	D-4	D-5	104.00	0.65	0.65	0.42	1.49	1.70	18 inch	14.85	4.44	156.00	153.92	0.020000	10.00	Concrete
P-5	D-5	D-6	160.00	0.58	0.60	0.35	1.84	1.40	24 inch	43.51	7.63	153.92	148.00	0.037000	10.00	Concrete
P-6	D-6	D-7	77.00	N/A	N/A	N/A	1.84	N/A	24 inch	22.62	3.08	144.77	144.00	0.010000	N/A	Concrete

*F.D.O.T. 4" INTENSITY*

## DOT Report

-Node- Upstream Downstream	Length (ft)	Inlet Area (acres)	Inlet C	Total CA (acres)	Inlet TC (min)	System Flow Time (min)	Inlet Discharge (cfs)	-Ground- Upstream Downstream (ft)	-HGL- Upstream Downstream (ft)	-Slope- Energy Constructed (ft/ft)	Section Size	-Section- Discharge Capacity (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Average Velocity (ft/s)
D-8	242.00	0.72	0.60	0.43	10.00	10.00	1.74	179.49	175.00	0.011736	18 inch	1.74	171.60	174.50	2.89
D-1								176.64	172.25	0.011983		11.50			
D-1	202.00	0.14	0.65	0.52	10.00	11.39	0.37	176.64	172.15	0.010017	18 inch	2.11	169.45	171.60	2.90
D-2								174.45	170.25	0.010644		10.84			
D-2	152.00	0.39	0.65	0.78	10.00	12.55	1.02	174.45	170.12	0.009196	18 inch	3.13	167.92	169.45	3.35
D-3								172.74	168.88	0.010066		10.54			
D-3	248.00	0.45	0.65	1.07	10.00	13.31	1.18	172.74	168.72	0.022459	18 inch	4.31	162.00	167.92	6.14
D-4								166.04	162.53	0.023871		16.23			
D-4	104.00	0.65	0.65	1.49	10.00	13.98	1.70	166.04	156.95	0.018687	18 inch	6.01	153.92	156.00	4.44
D-5								161.75	155.19	0.020000		14.85			
D-5	160.00	0.58	0.60	1.84	10.00	14.37	1.40	161.75	154.89	0.031540	24 inch	7.42	148.00	153.92	7.63
D-6								160.50	148.56	0.037000		43.51			
D-6	77.00	N/A	N/A	1.84	N/A	14.72	N/A	160.50	145.96	0.001308	24 inch	7.42	144.00	144.77	3.08
D-7								151.00	146.00	0.010000		22.62			

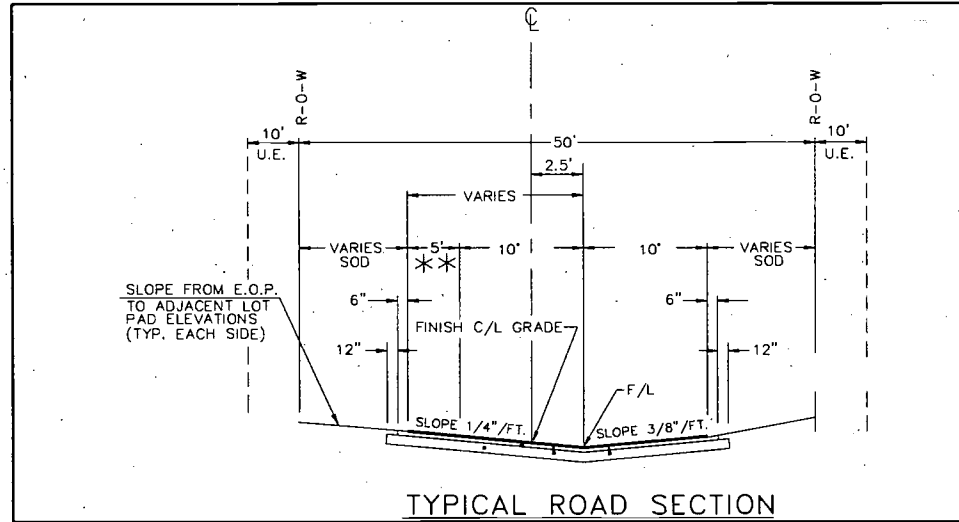
*F.O.D.T. 4" INTENSITY*



**TOTAL DISCHARGE, CFS  
ABERDEEN PHASE III  
50' RIGHT-OF-WAY**

**Manning's Equation:**  
 $Q = 1.486 \times A \times R^{2/3} \times S^{1/2} / n$

Where; **S** = Roadway Slope, %  
**A** = Section Area, sq.ft  
**Q** = Gutter flow rate, in ft<sup>3</sup>/sec  
**R** = Hydraulic Radius, sq. ft.  
**n** = Manning's roughness coefficient



Section	Width (ft)	Area (sq. ft.)	R (ft)	n	Manning's n Values Type of Gutter Pavement
Roadway	10.00	0.740	0.074	0.016	Asphalt Pavement - Rough texture

Slope %	Roadway (cfs)
0.50%	0.856
0.55%	0.898
0.60%	0.938
0.65%	0.976
0.70%	1.013
0.75%	1.049
0.80%	1.083
0.85%	1.117
0.90%	1.149
0.95%	1.180
1.00%	1.211
1.05%	1.241
1.10%	1.270
1.15%	1.299
1.20%	1.327
1.25%	1.354
1.30%	1.381

Slope %	Roadway (cfs)
1.35%	1.407
1.40%	1.433
1.45%	1.458
1.50%	1.483
1.55%	1.508
1.60%	1.532
1.65%	1.556
1.70%	1.579
1.75%	1.602
1.80%	1.625
1.85%	1.647
1.90%	1.669
1.95%	1.691
2.00%	1.713
2.05%	1.734
2.10%	1.755
2.15%	1.776

Slope %	Roadway (cfs)
2.20%	1.796
2.25%	1.817
2.30%	1.837
2.35%	1.857
2.40%	1.876
2.45%	1.896
2.50%	1.915
2.55%	1.934
2.60%	1.953
2.65%	1.972
2.70%	1.990
2.75%	2.008
2.80%	2.027
2.85%	2.045
2.90%	2.063
2.95%	2.080
3.00%	2.098

ALTA...  
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